

IN THE CLAIMS:

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
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8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)
13. (Cancelled)

14. (New) A coil forming and insertion apparatus comprising:

a winding jig for forming a multipole coil of joined plural monopole coils, said winding jig comprising plural coil winding frames, each of said coil winding frames defining a winding axis and receiving loops of wire wound thereon to form one of said plural monopole coils;

an inserter jig opposed to said winding jig, for inserting and arranging the multipole coil into a slot extending radially outward from a central opening in a stator

coil, said inserter jig comprising plural coil receiving elements for respectively receiving the monopole coils from said coil winding frames, each of said coil receiving elements being aligned with a coil winding frame; and

transfer means for transferring each monopole coil from said winding jig to said inserter jig.

15. (New) The coil forming and insertion apparatus according to claim 14, wherein each coil winding frame has a tip face with a fitting slot extending therefrom in parallel with the winding axis, for receiving tip portions of the coil receiving elements, said coil receiving elements, when fitted within said fitting slots forming transfer surfaces for moving said multipole coil from said winding jig onto said inserter jig.

16. (New) The coil forming and insertion apparatus according to claim 14, wherein each of said coil wind frames has a piston centrally mounted for reciprocating movement between a retracted position and an advanced position, whereby movement of said pistons toward the advanced position serves to transfer said multipole coil to said inserter jig.

17. (New) The coil forming and insertion apparatus according to claim 14, wherein each coil winding frame includes:

an inside portion and an outside portion radially outward of said inside portion relative to the winding axis; and

means for moving said outside portion relative to said inside portion to change

the distance between the outside portion and the inside portion between a winding position for winding the electric wire thereon and a release position for removal of the monopole coil after the winding has been completed.

18. (New) The coil forming and insertion apparatus according to claim 17, wherein said outside winding frame portion is stepwise increased in diameter toward said inserter jig.

19. (New) The coil forming and insertion apparatus according to claim 14, wherein:

said winding jig further comprises a turning arm rotatable around a central turning axis and an index holder rotatably supported by the turning arm for rotation relative to the turning arm around a central axis of rotation offset from and parallel to said central turning axis;

said plural coil winding frames are arranged depending from said index holder in a circular array and approximately equidistant from said central axis of rotation;

said winding axes of said respective coil winding frames are approximately parallel to each other and to said central turning axis; and

each coil winding frame is reciprocally mounted for movement along said central turning axis relative to said index holder, between a retracted position and an advanced position wherein the winding frame is projected toward said inserter jig, axially beyond the remaining coil winding frames.

20. (New) A coil forming and insertion apparatus comprising:

a winding jig, rotatable around a central axis, for forming a multipole coil of joined

plural monopole coils, said winding jig comprising plural coil winding frames, each of said coil winding frames defining a winding axis and receiving loops of wire wound thereon to form one of said plural monopole coils, wherein said winding axes are approximately parallel to each other and equidistant from said central axis;

an inserter jig opposed to said winding jig and comprising:

plural slidable cores, respectively aligned with each winding axis, for inserting and arranging the multipole coil into a slot extending radially outward from a central opening in a stator; and

coil receiving elements arranged around an outer circumference of each slidable core for connecting with respective coil winding frames to form a transfer surface for transfer of the monopole coils from said coil winding frames onto said coil receiving elements, said slidable cores being extendable to transfer a monopole coil from a coil receiving element into the slot in the stator.

21. (New) The coil forming and insertion apparatus according to claim 20, wherein each coil winding frame has a tip face with a fitting slot extending therefrom in parallel with the winding axis, for receiving tip portions of the coil receiving elements, said coil receiving elements, when fitted within said fitting slots, forming transfer surfaces for moving said multipole coil from said winding jig onto said inserter jig.

22. (New) The coil forming and insertion apparatus according to claim 20, wherein each of said coil wind frames has a piston centrally mounted for reciprocating movement between a retracted position and an advanced position, whereby movement of said

pistons toward the advanced position serves to transfer said multipole coil to said inserter jig.

23. (New) The coil forming and insertion apparatus according to claim 20, wherein each coil winding frame includes:

an inside portion and an outside portion radially outward of said inside portion relative to the winding axis; and

means for moving said outside portion relative to said inside portion to change the distance between the outside portion and the inside portion between a winding position for winding the electric wire thereon and a release position for removal of the monopole coil after the winding has been completed.

24. (New) The coil forming and insertion apparatus according to claim 23, wherein said outside winding frame portion is stepwise increased in diameter toward said inserter jig.

25. (New) The coil forming and insertion apparatus according to claim 20, wherein:

said winding jig further comprises a turning arm rotatable around a central turning axis and an index holder rotatably supported by the turning arm for rotation relative to the turning arm around a central axis of rotation offset from and parallel to said central turning axis;

said plural coil winding frames are arranged depending from said index holder in a circular array and approximately equidistant from said central axis of rotation;

said winding axes of said respective coil winding frames are approximately

parallel to each other and to said central turning axis; and

each coil winding frame is reciprocally mounted for movement along said central turning axis relative to said index holder, between a retracted position and an advanced position wherein the winding frame is projected toward said inserter jig, axially beyond the remaining coil winding frames.

26. (New) A coil forming and insertion method utilizing a winding jig having plural winding frames for forming a multipole coil and an inserter jig for inserting and arranging the multipole coil in a slot extending radially outward from a central opening in a stator core, said method comprising:

winding an electric wire around each of the plural coil winding frames to form plural monopole coils connected as a mutipole coil; and

simultaneously transferring the plural monopole coils from said winding frames onto coil receiving elements of said inserter jig.

27. (New) The coil forming and insertion method according to claim 26, wherein each monopole coil is delivered from a coil winding frame to a coil receiving element along a continuous surface formed by insertion of a tip portion of a coil receiving element into a slot extending in parallel with the winding axis from an end face of a coil winding frame.

28. (New) The coil forming and insertion method according to claim 26, wherein each coil winding frame comprises a central slidable core and wherein said transferring is by advancing the slidable core toward the inserter jig, whereby each monopole coil is

delivered to a predetermined position on the inserter jig.

29. (New) The coil forming and insertion method according to claim 26, wherein each monopole coil is released from each coil winding frame by reducing the outside diameter of each coil winding frame in said transferring.

30. (New) The coil forming and insertion method according to claim 29, wherein:

in the winding step, the outside diameter of each monopole coil is increased in a direction toward the inserter jig by winding the electric wire around a winding frame having its outside diameter increased stepwise in said direction; and

in the transferring step, each monopole coil is released from each coil winding frame by reducing the outside diameter of each coil winding frame in said direction.

31. (New) A coil forming and insertion method comprising:

winding an electric wire into loops around each of plural coil winding frames of a winding jig to form a monopole coil on each of the winding frames, with the monopole coils joined together in a circular array as a multipole coil, wherein the coil winding frames are approximately parallel to each other;

inserting plural coil receiving elements, surrounding a core mounted on the inserter jig for axial sliding movement relative to the receiving elements, into a central opening in each monopole coil mounted on a coil winding frame and thereby connecting with the coil winding frame to form a transfer surface;

transferring the monopole coils along the transfer surfaces, from the winding jig

onto to inserter jig; and

advancing the cores of the inserter jig to insert the multipole coil into a slot in a stator.

32. (New) The coil forming and insertion method according to claim 31, wherein each monopole coil is delivered from a coil winding frame to a coil receiving element along a continuous surface formed by insertion of a tip portion of a coil receiving element into a slot extending in parallel with the winding axis from an end face of a coil winding frame.

33. (New) The coil forming and insertion method according to claim 31, wherein each coil winding frame comprises a central slidable core and wherein said transferring is by advancing the slidable core toward the inserter jig, whereby each monopole coil is delivered to a predetermined position on the inserter jig.

34. (New) The coil forming and insertion method according to claim 31, wherein each monopole coil is released from each coil winding frame by reducing the outside diameter of each coil winding frame in said transferring.

35. (New) The coil forming and insertion method according to claim 34, wherein:

in the winding step, the outside diameter of each monopole coil is increased in a direction toward the inserter jig by winding the electric wire around a winding frame having its outside diameter increased stepwise in said direction; and

in the transferring step, each monopole coil is released from each coil winding



frame by reducing the outside diameter of each coil winding frame in said direction.